



TWO WHEELER SECURITY SYSTEM

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ABSTRACT

Vehicle security system is a very important topic over the years. due to the increasing vehicle theft cases reported all over the world. Many vehicle security system is suitable for the four wheelers but for two wheelers, the systems available in market are of no match to the well equipped thieves. When under attack, these system can only immobilize the engine and sound a loud alarm. It is a serious limitations. In our paper, we focused on security and tracking the vehicle by using Advanced GSM and GPS. In our project new features are added in addition to the engine immobilizer and sound alarm. Important features supported by our system are alerting owner by SMS about the theft attempt, allowing user to control the system remotely by SMS, tracking the locations of vehicle using GPS technology, Remote Keyless System. Our system is designed to be compatible with almost all the brands of vehicle.

KEYWORDS: Vehicle Tracking, Locking, microcontroller, GPS, GSM.

I. INTRODUCTION

Vehicle security is very important thing in modern life. So idea of our project is, If bike is parked somewhere, accelerometer sensor will record its indication at a time of parking. vehicle theft cases increasing all over the world. advanced vehicle security systems available only for the four wheeler.

As of the security system for two wheelers is concerned the system Vehicle security system has been a topic of great interest over the years due to ems available in market are of no match to the well equipped thieves. At the time of theft, these systems can only immobilize the engine and sound a loud alarm. As data Provided by the Ministry of Road Transport and Highways Government of India, there were 3.90 lakhs accidents in the year 2000; 78,911 were killed and 3,99,265 were injured. Accidents are quite common on Indian roads and are increasing due to increase in number of vehicle. GSM modem is a wireless device, which sends and receives data through radio waves. A GSM modem requires a SIM card to operate as a GSM mobile phone. GSM modem support standard AT commands as well as extended set of AT commands. With the standard AT commands and extended AT commands. If accident occurs then information about the accident as location is send via SMS to the stored number through GSM. easy to identify the vehicle locations. Vehicle tracking systems have brought this technology to the day-to-day life of the common person. Today GPS used in cars, ambulances, fleets and police vehicles are common on the roads of developed countries. All the existing technology support tracking the vehicle place and status.

Today GPS and GSM based system are very important. Today use of GSM and GPS based systems are increases throughout the world. System designed for users in land construction and transport business, provides information such as location, speed and expected arrival time of the user is moving vehicles in easy format. This system are useful for communication process among the two points.

II. SURVEY OF THE RELATED WORK

The proposed GPS/GSM based System has the two parts, first is transmitter unit and another is receiver station. The system processes, interfaces, connections, data transmission and reception of data among the transmitter unit and receiver stations are working successfully.

A vehicle tracking system is an electronic device which installed in a vehicle to enable the owner or a third party to track the vehicle's location. By using this paper we design vehicle tracking system using GSM & GPS system. This system based on embedded system, used for tracking and positioning of any vehicle by using GPS and GSM. This system design will continuously watch a moving Vehicle and report the status of the Vehicle at the time of theft.

There are so many security and tracking systems available for 4 wheeler vehicles. But these facilities available for costly vehicles only like BMW, Mercedes etc. but this security system is not available in two wheeler. The reason for this is these system requires compatibilities with vehicles and also costly. Here we have an idea for two wheeler security system. We will interface GSM, GPS, RF modules to ARM7 based LPC2148 Microcontroller. System will have 2 units remote node and vehicle node. These 2 nodes will communicate through RF modules as these modules uses free band for communication. But it has limited range of 100

meters. So we have an option like GSM. When bike will be out of range of RF, we will SMS to bike node to lock/unlock it. It is for theft prevention. As these modules and system low cost we think that we can install this system for any 2 wheeler. Of course this is an innovation towards automotive field.

III. PROPOSED METHOD

We can track the theft vehicle by using GPS and GSM technology which are mentioned in this paper. This system puts into sleeping mode while the vehicle handled by the owner or authorized person otherwise goes to active mode, the mode of operation changed by person or it can be remotely handled. If any interruption occurred the RF module senses the signals and SMS sends to the microcontroller. The microcontroller issues the message about the place of the vehicle to the owner or authorized person. Receiver section send SMS to the controller and then issues the control signals to the engine motor. Engine motor speed will be gradually decreases and stop two wheeler then Vehicle will be locked.

A. Block Diagram

The Block diagram of two wheeler security system based on GSM and GPS technology is shown in fig-1 and fig-2

Our project purpose is to be design and develop an advanced security system for two wheeler. This can be achieved by interfacing GSM module and RF module with microcontroller. Our hardware components of this project has Buzzer, Accelerometer sensor, RF module, GPS, GSM, LCD display, Relay.

Transmitter section

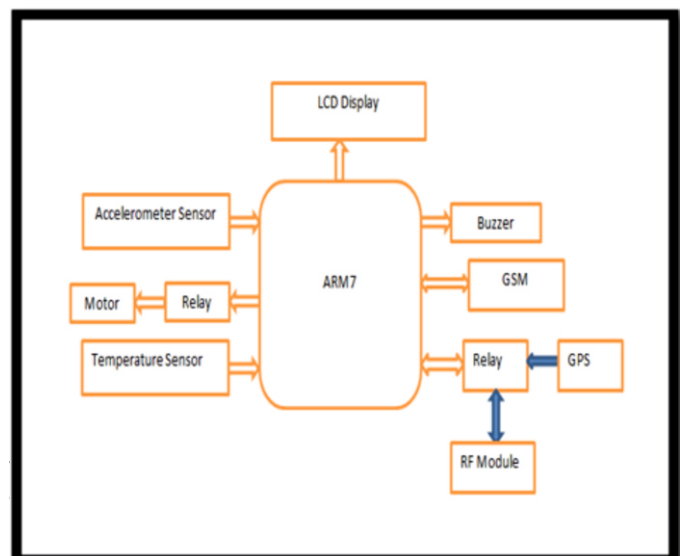


Fig1. Block diagram of transmitter section

Receiver section

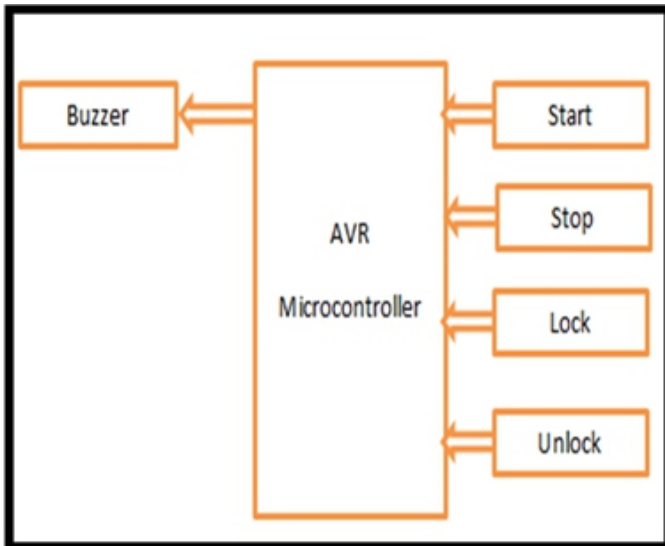


Fig2. Block diagram of Receiver section

B. Block diagram Description

In electronics field, there is always need one basic thing: Power. In every electronic circuit component power supply is must. The exact amount of voltage and current should be supplied to electronics circuit. If the power exceed its limit, it will fatal. Below is the circuit diagram of power supply in that diagram output of 5V is required for microcontroller. Its circuit diagram and designing calculation are given below C.GPS Technology

The GPS smart receiver has features Ultra low power GPS architecture and 16 channels. Because of above features enabled GPS receiver as high position, velocity and time accuracy performances, high sensitivity and tracking capabilities. The GPS receiver is ideal for many portable applications such as PDA, Tablet PC, smart phone etc.

Features

- Ultra high sensitivity: -165dBm
- Low power consumption: Typical 45mA@3.3V
- Operating voltage: 3.0V to 4.2V
- Small form factor: 15x13x2.7mm



Fig3. GPS Modem

D. GSM Modem

Global System for Mobile Communications (GSM) is famous mobile phone system in the world. The name GSM first comes from a group called Group Special Mobile (GSM). Group Special Mobile was invented in 1982 by the European Conference of Post and Telecommunications Administrations (CEPT).CEPT develop a pan-European cellular system and it replace the many existing incompatible cellular systems.GSM mostly uses Frequency Division Multiplexing AND Time Division Multiplexing. Each one is divided into 200 kHz wide channels. As far as TDMA goes, each time slot is 577 micro seconds long, having 8 slices of frame, lasting for a grand total of 4.615ms. A multi frame consists 51 frames, 51 multi frames form a Super frame, and 2048 Super frames form a Hyper frame which is 2715648 frames.

Features

- It has High sensitivity -160dBm
- It can Search up to 65 Channel of satellites
- LED indicate data output
- Supporting NMEA0183 V 3.01 data protocol
- It can Works from +5V DC signal and outputs 9600 bps serial data



Fig4. GSM Modem

E. RF Transceiver:

RF Transceiver is an FSK Transceiver module, which designed by using the Chip on IC(CC2500). It is a true single-chip transceiver, It is mainly based on 3 wire digital serial interface and Phase-Locked Loop (PLL) for precise local oscillator generation .so the frequency could be setting. It can use in UART / NRZ / Manchester encoding / decoding. It is a high performance and low cost module. In a tyAVRat system, this trans-receiver will be used together with a microcontroller. It can be used in 2400-2483.5 MHz ISM/SRD band systems. It can be used on wireless security system or specific remote-control function and others wireless system.

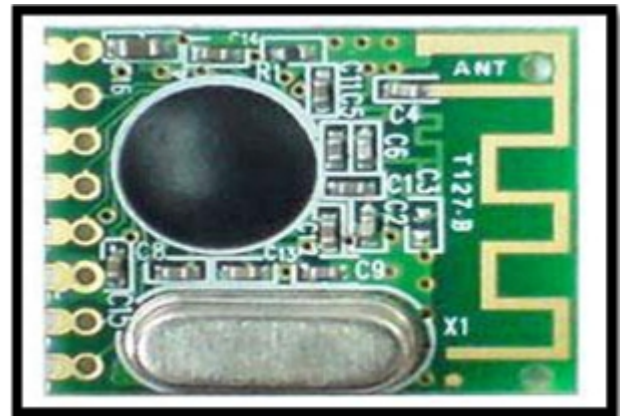


Fig5. RF Transceiver

Features:

- It have Available frequency at : 2.4~2.483 GHz
- It has Programmable output power -20dBm~1dBm
- It has Operation temperature range : -40~+85 deg C

Regulator power Supply

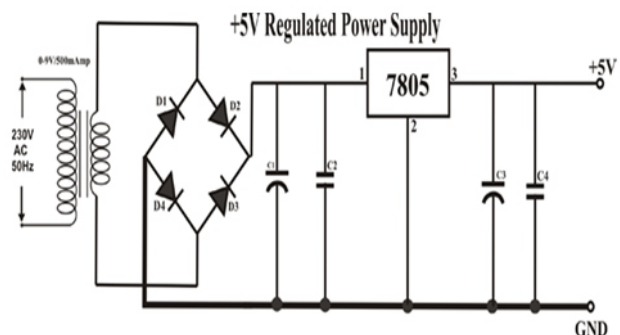


Fig6. +5 V power supply

The +5 volt power supply is based on the 7805 voltage regulator IC. This IC contains all the circuitry needed to accept any input voltage from 8 to 18 volts and produce a steady +5 volt output, accurate to within 5% (0.25 volt). It contains current-limiting circuitry and thermal overload protection, so that the IC won't be damaged in case of excessive load current since it will reduce its output voltage. The advantage of a bridge rectifier is you don't need a centre tap on the secondary of the transformer. A further but significant advantage is that the ripple frequency at the output is twice the line frequency (i.e. 50Hz) so that it makes filtering easier. The use of capacitor c1, c2, c3 and c4 is to make signal ripple free. The two capacitor used before the regulator is to make ac signal ripple free and later which we are using is for safety, if incase there is a ripple left after regulating, then c3 and c4 will remove it.

F. Proposed Circuit Diagram

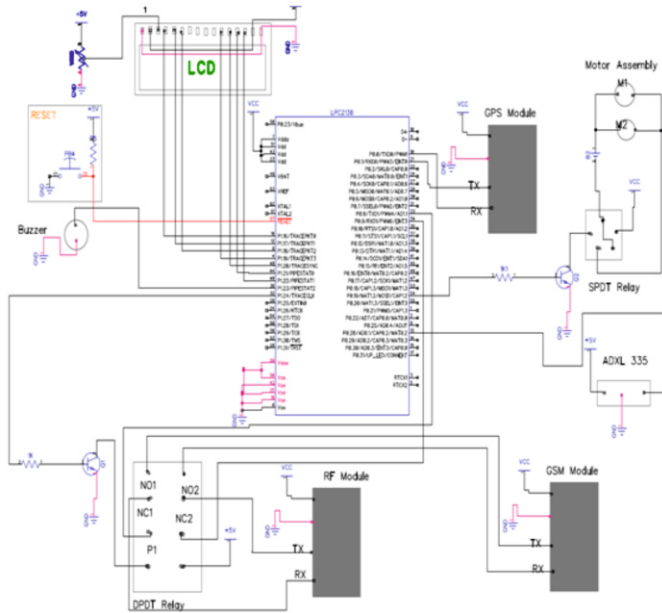
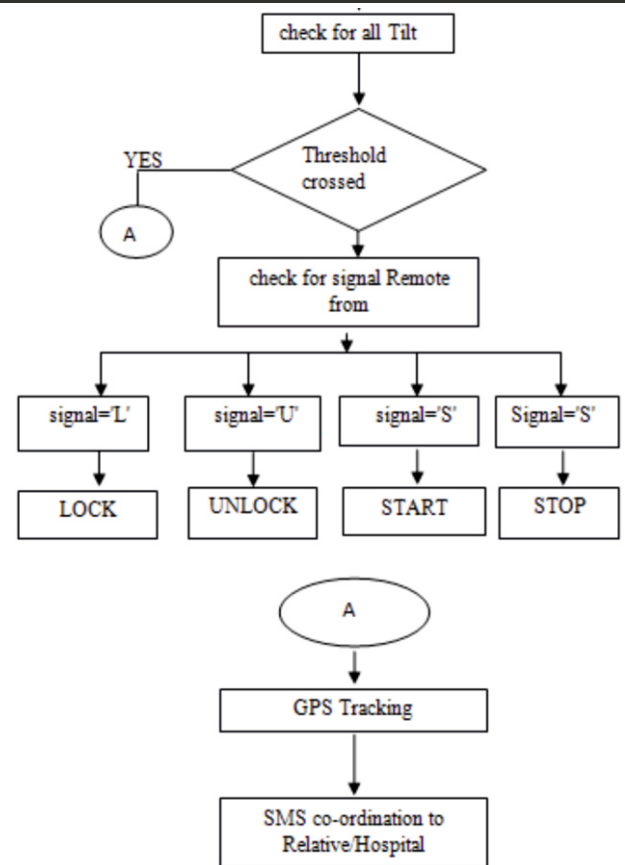
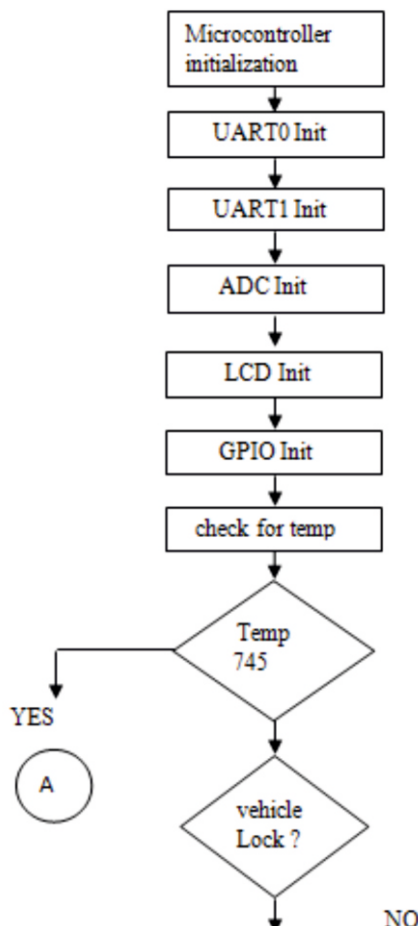


Fig 7. circuit diagram of two wheeler security system

Flowchart



Flow chart of project

G. ARM

This processor architecture is capable of up to 130 MIPS on a typical 0.13 μm process. It is a versatile processor designed mainly for mobile devices and other low power electronics. This processor supports both 32-bit and 16-bit instructions using the ARM and Thumb instruction sets. The ARM7TDMI processor core implements ARM architecture v4T.



Fig8 .ARM

Features

- It has CPU operating voltage range of 3.0 V to 3.6 V ($3.3 \text{ V} \pm 10\%$) with 5 V tolerant I/O pads.
- It has Power saving modes include Idle and Power-down.
- It has two 32-bit timers/counters, PWM unit (six outputs) and watchdog.
- It has 8 kB to 40 kB of on-chip static RAM and 32 kB to 512 kB of on-chip flash memory.
- It has 128-bit wide interface/accelerator enables high-speed 60 MHz operation.

H. Work Implimentation and discussion

We will interface GSM, GPS, RF modules to ARM7 based LPC2138 Microcontroller. System will have 2 units remote node and vehicle node. These 2 nodes will communicate through RF modules as these modules uses free band for communication. But it has limited range of 100 meters. So we have an option like GSM. When bike will be out of range of RF we will SMS to bike node to lock/unlock it. It is for theft prevention. As these modules and system low cost we think that we can install this system for any 2 wheeler. Of course this is an innovation towards automotive field.

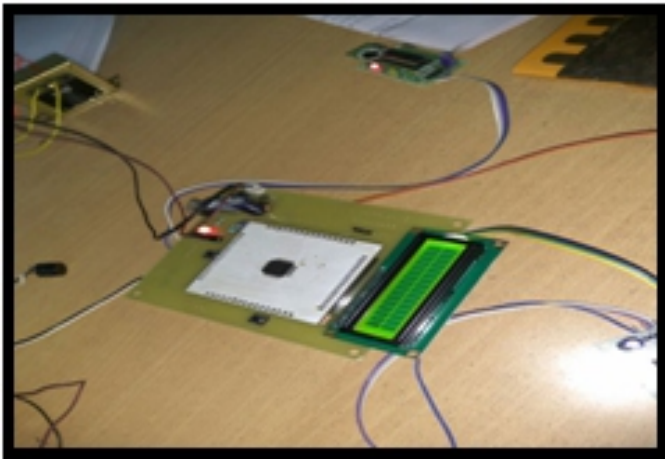


Fig9.Bike mode



Fig10.remotr mode

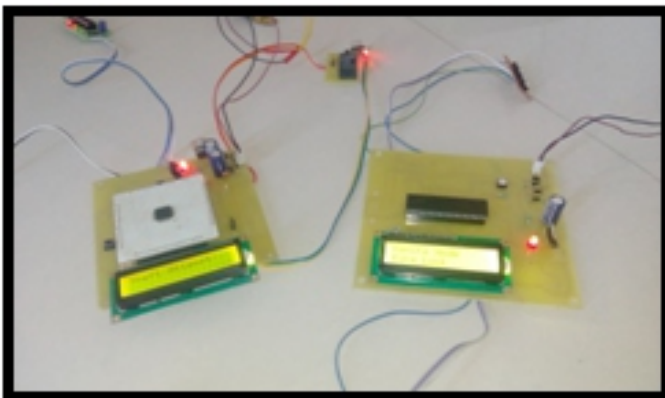


Fig11theft attempt detect

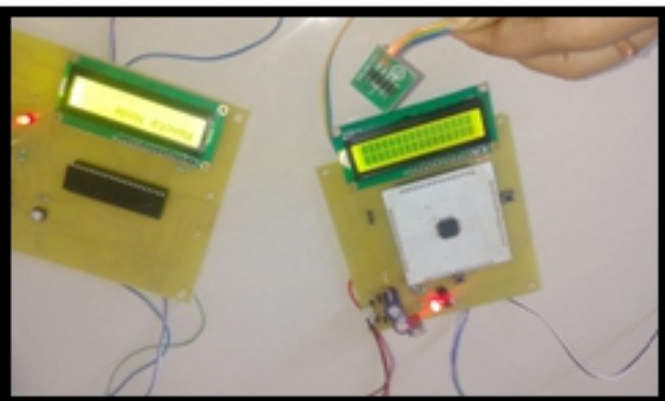


Fig12.accident detect

I. Debugging and Testing Process

A microcontroller-based system is activity that involves hardware and software interfacing with the external world. Doing well design of a microcontroller-based system requires variety of debugging and testing tools available. The types of debugging and testing of microcontroller-based systems are software-only

tools and software-hardware tools. Software-only tools come as monitors and simulators, which are not dependent of the hardware under development. Software-hardware tools are usually hardware dependent, more expensive. Advantage of higher the level of integration with the target hardware are the greater the benefit of a tool, resulting in a shorter development time, as well as increases cost. The main factors to consider when choosing a debugging tool are cost, simple use and the features offered during the debugging process.

Hardware Assembling and Testing:

First step is Hardware to make single side PCB layout for the given circuit diagram. After made the PCB the following steps are required to complete Assembling.

1. Assemble all the components on the PCB and PCB based on circuit diagram. TX and RX pins of the GSM modem to pins 13 and 14 of MAX 232 then insert a valid SIM in the GSM modem.
2. Then connect the GPS module according to circuit diagram.
3. implementation and testing of project done successfully by us.
4. Our system is very useful and secure for two wheeler owners.

CONCLUSION

The proposed security system have advantages are gives space, in terms of hardware and software and easily add custom based applications to make the product more user-friendly. Proposed TWVSS can be easily installed on two wheeler vehicle of any company, so creating a huge market for the product. Our device cost is so efficient that it could also be even bought by the owners of the low end bikes. Due to Small size of the module it can placed under the seat of the vehicle, So there is no need of physical changes to be done to the vehicle. By installing our proposed security system two wheeler vehicle thefts that are encountered these days could be highly suppressed.

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